

# **Value and Validity in Action Research**

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## **A Guidebook for Reflective Practitioners**

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# 4

## Designing the Methodology

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Now that you have thought about your question(s) and researched the literature that relates to your topic(s), you need to think about how you're going to conduct your study. Previous chapters have discussed the importance of the research question and the usefulness of the review of literature in ensuring validity in your study. This chapter will discuss other key aspects of validity.

Before we discuss the specifics of your study, it might be useful to look at some research designs. While you will not be using any of these designs, they do raise some issues that you too will need to address in developing your project.

### QUANTITATIVE DESIGNS

Quantitative research measures the extent to which or how well something is done. It seeks only answers that can be quantified. Validity is addressed in the design of the methodology and the analysis of the data. Researchers strive to make sure that they are reporting relationships that really exist. Internal validity refers to the credibility of the conclusions drawn from the data regarding the effectiveness of the treatment. External validity pertains to the generalizability of these effects to other groups.

Here are some examples of quantitative designs. Each has different strengths and weaknesses in ensuring validity. The following definitions

are taken from *How to Design and Evaluate Research in Education* (Fraenkel and Wallen, 2003).

**Exercise A.** Read the following explanations and examples. Answer the question after each example.

1. Experimental—an independent (experimental) variable is manipulated while other variables are controlled; the effect on the dependent variable is observed; this is one of a few designs that can show causality.

To control for confounding variables, researchers use random samples (every member of the population has an equal chance of being selected for the study) and random assignment (individuals are assigned randomly to the experimental and control groups). Sometimes a stratified random sample (subgroups are represented in the sample in the same proportion as in the population) is used. For example, we know that race and class can have an impact on achievement. If you were studying the effects of a certain reading program on reading achievement, you'd have to make sure that your two groups were equivalent in terms of race and class. There may be other factors that affect reading achievement. What if one group had a significantly larger number of boys than girls in it? Gender could also be a confounding variable. One of the researchers' main concerns is that significant, extraneous variables are equally distributed in both groups. In other words they need to know whether or not the experimental variable is causing the effect, rather than some other variable.

**Example—**Suppose you want to know whether mentoring improves students' attendance in high school. You could select all the ninth graders in a high school with low attendance. You could randomly select fifty of those students and randomly assign them to two groups: twenty-five would receive mentoring and twenty-five would not. At the end of the study, students' attendance would be compared.

- Would you want to use a stratified random sample? Why or why not?
2. Causal-comparative—an attempt to discover the cause for or the consequences of existing conditions in groups or individuals. Some-

times researchers want to know the effect of a certain variable, for example gender, on achievement. Studies have shown that girls usually perform better in language activities and boys in mathematical ones. Causal-comparative studies attempt to suggest causation, but causation can be proved only with experimental designs.

**Example—**Suppose you have a group with an existing condition, for instance, gender, and you want to know whether females have a greater ability to do spatial reasoning. You could look at a group of males and a group of females and measure their ability in spatial reasoning.

- Do you see any weaknesses in this design?

3. Correlational—examination of two variables to see if a relationship exists; it is used to predict what will happen to one variable if the other increases or decreases; it does not show causality. In correlational research, one needs two variables that can be quantified (not categorical variables, like gender). Early lawsuits against tobacco companies, claiming that smoking caused lung cancer, were not successful because correlations could show that there was a positive relationship between smoking and deaths from lung cancer, but could not prove causality. Could there have been other causes, like genetic predispositions, sedentary lifestyles, or air pollution? One must be able to make a convincing argument, using logic and a preponderance of evidence, that correlations do strongly suggest that causality exists. Juries were eventually convinced by these arguments and ruled against tobacco companies.

**Example—**Suppose you wanted to know whether there was a relationship between the amount of disruptive behavior in a classroom and the teacher's expectation of failure. You could measure each variable and see whether there is a positive correlation (as one increases, so does the other) or a negative correlation (as one increases, the other decreases) or no correlation at all.

- How could a researcher quantify "teacher's expectations of failure"? What do you think the research would show?
4. Survey—an attempt to discover a certain group's status with regard to certain variables. Information is gathered about people's opinions,

attitudes, knowledge, and so on. Many problems affect the trustworthiness of the survey results. The instrument may be confusing or misleading. Those surveyed may not represent the larger population, or the sample size may not be large enough. The researcher may get a poor response rate.

Example—Perhaps you want to know about your students' study habits at home. You could survey the parents.

- What problems in analyzing the survey results could occur? What other group could you survey to corroborate the results?

## QUALITATIVE DESIGNS

Qualitative research seeks to describe the quality of certain aspects of a phenomenon. Instead of trying to quantify certain effects, relationships, or attitudes, qualitative researchers seek to understand how or why something is done. They examine complex situations in great depth.

Validity in qualitative research is a complex and contentious issue. Some researchers have eschewed the term because of its origin in quantitative research and substituted "trustworthiness" (Zeichner and Noffke, 2001). Theories of validity in qualitative research range from that of Lincoln and Guba (1985), who call for new criteria for validity, to that of Goetz and LeCompte (1984), who use the quantitative terms "internal validity" and "external validity," but modify the meanings to fit qualitative research. Some theorists use the term "truth value" to refer to the confidence in the truthfulness of the findings, "applicability" to refer to the degree to which these findings can be applied to other contexts, "consistency" to refer to the ability to reproduce the same findings in similar contexts, and "neutrality" to refer to the degree to which the findings are free of researcher bias (Guba and Lincoln, 1981, p. 103). These terms convey the same concerns as the scientific paradigm's use of "internal validity for truth value, external validity or generalizability for applicability, reliability for consistency, and objectivity for neutrality" (p. 104).

Qualitative research has many variations. Listed below are just a few. There is overlap in the following definitions. "Ethnographic" and "naturalistic" can be used interchangeably. Many ethnographers use participant

observation. These definitions are taken from *How to Design and Evaluate Research in Education* (Fraenkel and Wallen, 2003).

5. Ethnographic—the collection of data on many variables in a naturalistic setting to gain a holistic understanding of a particular group in a particular culture. Ethnographers work to interpret the culture of a group by spending long periods of time in the setting, by understanding multiple perspectives and the larger contexts of various issues, and by reporting their findings in thick, rich description.

Example—You might want to know the effect of a new principal on a school during the first year of her tenure. You would visit the school frequently; interview the administrators, students, staff, parents; attend meetings; collect artifacts; as well as collect other data to give a complete picture of the effect of the principal on the school.

- What kinds of difficulty might this study present?

6. Naturalistic—the collection of data while the researcher controls nothing and does not affect the observed in any way. The researcher tries to be as unobtrusive as possible as she observes the individuals in their natural setting.

Example—If you wanted to understand how girls and boys interact while playing during recess, you could watch them from a distance and note their interactions.

- Would there be any ethical dilemmas for the researcher?

7. Participant observer—an outside researcher becomes a participant in the research. Sometimes the researcher makes her presence known to the members of the group as she works with them while observing them and collecting data. Other times researchers remain "undercover" to get more accurate data. However, the ethics of observing people without their knowledge is questionable.

Example—You might want to study how teachers work together to create interdisciplinary units. You would join a group of teachers in writing a curriculum and observe them, take notes, interview them, collect artifacts, and then analyze and describe their interactions.

- What problems with objectivity might the researcher have?

8. Case study—in-depth investigation of individuals or groups used to determine the relationship between certain variables and certain behaviors.

**Example—**You might have two students in your class, one who understands math concepts very quickly and one who struggles. You might study the two students over the course of the year to try and determine what is contributing to the difference.

- Would you be able to generalize to other students who are having difficulty in math?

9. Content Analysis—analysis of written or visual contents of a document. This kind of analysis can yield interesting information about a group within a culture indirectly by examining its beliefs and behaviors through its communications. To do a content analysis, you must clarify what you are analyzing by defining the terms and deciding what you will look at, then create a sampling plan. You need to choose categories that you will use to examine the content. Indirect study of this kind can supplement other research methods, such as surveys or participant observation. One drawback to this kind of analysis is that the content must be in a written or recorded form. Interpretation of content analysis also presents problems. The quality of the content analysis will depend in part upon the degree to which the categories of analysis match the intended meaning of what is being studied.

**Example—**If you wanted to analyze the treatment of women in a literature textbook, you would define what you meant by “treatment of women characters” and create categories that you could use in your analysis. You might look at how these characters are described physically, psychologically, and spiritually.

- What other topics could you look at in a literature textbook?

## DESIGN OF YOUR STUDY

As you design your action research study, you need to think about the setting, the participants, the procedures, the data collection methods, and finally data analysis.

By doing the following exercises, you should be able to outline your methodology.

### Setting

Where you do your study will have a great impact on your results. Schools across the United States have different cultures. They have different expectations, standards, curricula, teachers, students, and parents. You may be in a small rural school or a large urban school. When other teachers read your action research study, they may want to implement your methodology in their classrooms. They won't be able to generalize your results; however, they may think your schools are similar enough that your project could be implemented in their schools. Or they may realize your school is very different from theirs and make some modifications to the project to create a better fit for their students. Describing your school and students in detail is a way to deal with issues of external validity, that is, applicability to other contexts.

What is important about your setting? How is it like and different from other schools?

**Exercise B.** Answer the following questions. Describe the attributes that best characterize your district and school.

1. Describe your district, if you are in a school district (urban or rural, size, socioeconomic status [SES], etc.).
2. Describe your school (private or public, size, grades, ethnicity, location, management style, specialty, etc.).

### Participants

The results of your study will vary, depending on your students. Teachers know that one class can be vastly different from another. Students can behave differently in the morning than in the afternoon. Students have individual needs and learning styles. Gender, race, and class can have an impact on how students learn. These variables are just a few of those that have an impact on learning.

Most elementary teachers will be working with one class of students throughout the day. Therefore, they won't be choosing which students will be participants in their study unless they are selecting a few students for case studies. Most secondary teachers work with more than one class each day. They will have to choose which class to use for their studies.

If you need to select one class, choose the most representative class, unless you have a reason not to. For example, you might want to work with a low-achieving group on study skills. In most cases, however, you want to choose your most typical class. Don't choose the first class of the day if they are sleepy in the morning, and don't choose the last class of the day if they are extremely energetic.

Limit your participants to one class. You will be collecting a great deal of data, so you don't want to be overwhelmed with data from two or more classes. In most cases, you should not try to compare two classes. If you want to use one method with one class and one with another, how will you know that it was the method that made a difference rather than some other variable, like ability, time of day, or special needs?

Consider using case studies and looking at a few students in depth. Case studies are not appropriate for all projects. But perhaps you are beginning to use guided reading with your first graders, and you want to know how effective it is for meeting the needs of diverse learners. You could assess the reading levels of your class and choose two students who aren't reading yet, two who are reading on grade level, and two who are reading above grade level. Although you'd be assessing the reading progress of all your students throughout the year, for the study you'd be collecting more data on these six students during a limited amount of time.

You are also a participant in your study. In quantitative research, the researcher should be transparent and not influence the study in any way. In action research you are studying yourself, your students, and your classroom. You are intrinsically involved in the study. You will try to remain as objective as possible when collecting data—for instance, by examining student work—and when drawing conclusions; however, you bring your own beliefs, biases, values, skills, knowledge, and personality to your classroom and to your action research.

#### Exercise C. Who will participate in your study?

1. Describe your class (age, gender, special needs, ethnicity, etc.).
2. How did you select this group of students? (Answer if you have more than one class to choose from.)

3. Describe yourself as the teacher-researcher. Do you have any special training in your topic?

#### Procedures

What are you going to do during your study? Your procedures are the heart of your study, and you need to think about them very carefully.

Think about what you learned from your review of literature. What have you learned that will inform your methodology? Let's say you investigated using brain-based learning because you want to incorporate some of these strategies into your classroom. You have asked the question, "How can a teacher use brain-based learning principles to affect students' understanding of fractions?" You might want to consider the following:

If the brain is a social brain, then you need to include more opportunities for students to engage in meaningful discourse.

If students construct their own knowledge, then you need to give them opportunities to observe and hypothesize—to use inductive thinking.

If assessment and instruction are cyclic, then you need to give more frequent and explicit feedback to students throughout the learning process.

Then you can start thinking about designing a unit that will have those components: opportunities for writing and talking about fractions, the use of manipulatives to allow observing and hypothesizing, and a process of increasing your feedback to students.

You also need to think about the length of time your study will require. If your study involves teaching a unit on fractions, your study will be in the same time period as the unit. However, what if your study deals with the use of guided reading? You'll be using guided reading for the entire year. Then you have to think about how long you will collect data. Your study has to be long enough to see some growth in student achievement, but it shouldn't be so long that you are overwhelmed with data.

**Exercise D.** Map your question and procedures by using some sort of visual organizer, like figure 4.1.

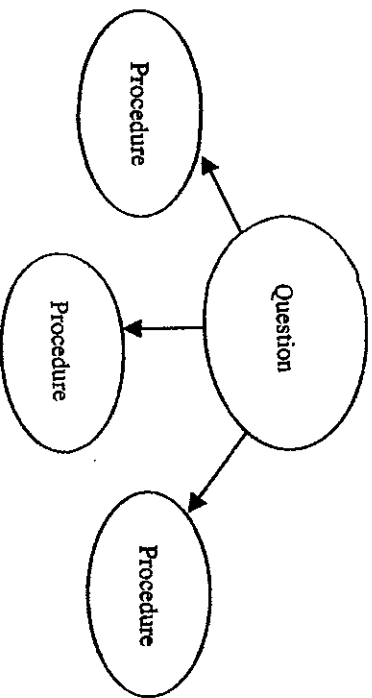


Figure 4.1. Visual Organizer

Think about what you have learned from the mapping and what implications this learning has for your methodology. Answer the following questions.

1. How did you design your study? Did you use any research?
2. What activities are you going to do with your students? (Develop your map into a plan.)
3. What resources will you use (books, speakers, field trips, etc.)?
4. Are you designing any materials? If so, what kind?
5. What is your timeline?

### Data Collection

How are you going to collect your data? You need to triangulate your data, that is, you need to collect data from at least three sources. This kind of data collection helps to ensure validity because you will be making inferences from multiple sources rather than drawing on one source to form a conclusion.

There are many sources that you can use to collect your data. Before you decide, you need to do a few things. Look at your question(s) again. What terms need to be defined? What terms need to be operationalized? In other words, you need to determine what something

books and sounds like before you can decide what data to collect. For example, if you want to examine the impact of teaching social skills on group interactions, what are you going to see and hear when a student is collaborating?

Use the following criteria to operationalize concepts.

1. Can you see or hear it?
2. Can you state it positively?
3. Is observing it feasible?

Here is how collaboration might be operationalized.

Student is

- facing other students
- making eye contact with other students
- sharing ideas
- asking for elaboration
- asking appropriate questions
- sharing materials

Exercise E. Operationalize one of the following:

- a. Interest in reading
- b. Tolerance toward people from different cultures
- c. Empathy toward others

Operationalize the concepts in your question.

Now review your research question and procedures as you read the following section. Think about which of the following data collection methods would be appropriate for your question.

### Journal

Every teacher-researcher must keep a daily journal. It is the most important way that you will have to keep track of the details of your study. Record objective notes about what is happening in your classroom.

Also include your reflections on what is happening. Ask yourself the following questions: What does this mean? Why do I think it is significant? Do I need to change something? Does it connect to something else? Do I see any patterns emerging? Can I draw any preliminary conclusions?

Although it will be a struggle to find time each day to write in your journal, your efforts will pay off when you analyze your data. You will have a detailed, accurate record of your project rather than a jumble of half-forgotten memories.

One way you can include both kinds of information is to use one page for objective observations and the opposing page for reflections. Figure 4.2 provides an example.

**Exercise F.** Describe an event that occurred in your class. Write objective observations and reflective comments about this event.

### Student Work

Student work is one of the most valuable ways to gain insights into student learning. You can collect written work, quizzes, and tests. You may want to photograph some of it. Lessons can be videotaped and audiotaped. A portfolio may be helpful to organize student work.

*A Candidate's Guide to NBC 2001-02* offers suggestions for analyzing student work for teachers working on National Board Certification. Here are twelve questions that may be helpful in looking at the work of your students.

Objective Observations	Reflective Comments
10-28 students brainstormed ideas for paper together. 9 of 24 students participated.	Most students seemed to enjoy the activity. Next time I'll let them brainstorm individually and then share suggestions with the class.

Figure 4.2. Objective Observations and Reflective Comments

1. What was the learning goal(s) of this assignment?
2. How does this work assignment demonstrate the learning goal(s)?
3. What did the student understand about the concept?
4. What did the student misunderstand about the concept?
5. What patterns of errors are evident in the work?
6. What criteria did I use to assess this work sample? (Not how did I grade the paper?)
7. How did the student assess his/her own work?
8. How did I give the student constructive feedback?
9. How is the feedback evident to the assessors?
10. What do I need to explain or reteach about this concept?
11. Based on the analysis of this work sample, what does the student need to learn next?
12. How can I connect future instruction to this learning? (American Federation of Teachers and National Education Association, 2001-2, p. 21)

By answering some or all of these questions, you may gain valuable insights into how your students are learning, what misunderstandings are blocking the learning, and how your instruction and assessment practices are influencing the learning.

You may want to develop a rubric to assess student work and check for progress.

### Rubrics

Rubrics are scoring guides that delineate the criteria and the gradations of quality for student work. "What elements must the work contain?" and "How well must these be completed for a certain grade or score?" are two questions that will help you to develop your rubric. Before designing your rubric, look at sample rubrics for ideas. When writing your rubric, use clear, specific language to capture observable qualities. For example, don't use the phrase, "has an interesting introduction" or "has a boring introduction" to describe an element in a composition. "Interesting" and "boring" are too subjective. Instead think about the strategies a writer might use to capture the readers' attention, for example, using an anecdote or questions, and be more objective and specific in describing the degrees



of quality in the introduction. You will need to put a great deal of thought into your rubric. However, if you have a well-designed rubric, it should be fairly easy to use.

### *Videotaping and Audiotaping*

Videotaping and audiotaping provide useful ways to capture a lesson. You may want to videotape and/or audiotape your students before you begin the study so that they will become used to it. Some students will act silly if they aren't used to being taped. Videotapes and audiotapes can be transcribed so that you have a written version to analyze. Make sure you get parental permission and check the policy in your school district.

### *Checklists*

Once you've operationalized your terms, you can turn them into a checklist of observable behaviors. For example, as students collaborate in groups, you can check off that they are facing each other or making eye contact. For example:

- Collaboration
- Student is
  - \_\_\_ facing other students
  - \_\_\_ making eye contact with other students
  - \_\_\_ sharing ideas
  - \_\_\_ asking for elaboration
  - \_\_\_ asking appropriate questions
  - \_\_\_ sharing materials

Keep the number of items on the checklist manageable, so you can easily circulate around the room and check off the items.

### *Surveys*

Fraenkel and Wallen (1990) have offered suggestions for using surveys. Think about whether you want open-ended or closed questions. Open-

ended questions will yield richer data, but those data will be more difficult to analyze. Closed questions are easier to tabulate. Both kinds of questions are subject to misinterpretation, so they must be worded carefully. You can use both types of questions on your survey.

Some suggestions for writing closed questions are as follows:

1. Avoid ambiguity. Make the questions clear.
2. Focus each question on only one thought.
3. Make the questions short.
4. Keep the language simple; avoid jargon.
5. Don't use language that would bias the respondent.
6. Don't use leading questions.
7. Don't use double negatives. (pp. 338-340)

Some surveys use a Likert scale to quantify responses to closed questions.

These questions start with a statement that must be reacted to with choices like "always," "usually," "occasionally," and "never." Numerical values are assigned to the answers: always = 4, usually = 3, occasionally = 2, never = 1. For example, you could state, "After I've read a story, I think about the meaning of the title." The higher the response the more likely a student is to consider the meaning of a title after reading a story. You could survey your class and get a mean score to determine the likelihood of students reflecting on a title (Mills, 2000).

Make sure you maintain the anonymity of those taking your survey. If you are giving the survey to students, provide a quiet setting. Students should not talk to each other while they are taking the survey.

Before you give the survey, proofread it carefully and make sure it is attractive. Don't make it too long.

**Exercise G.** Rewrite these survey questions so that they meet Fraenkel and Wallen's criteria. Explain what the problems are in each question.

1. Do you spend a lot of time reading?
2. Do you like to read books about real men and women who have accomplished great things, or do you like to read about fictional characters?
3. How does asking predicting questions help you to better comprehend the story?

4. Would you not be interested in reading books about people from other cultures?
5. Why do you think reading is important?

### *Interviews*

While interviews take more time than surveys, they often provide detailed responses that surveys don't. You can establish rapport with your interviewee and perhaps get information that would not be shared on a survey. You can ask the person to expand on an answer or clarify it. Consider taping your interview if the interviewee is not uncomfortable with the tape recorder.

Some of the same suggestions that were mentioned for surveys apply to interviews. Carefully word your questions. Make them clear and keep the language simple. Choose a location that provides privacy for you and the interviewee.

### *Pre- and Posttests*

Depending on your question(s), it may be appropriate to give students a test before and after the study so that you can see any changes in achievement. The tests could be objective. Depending upon your study, you could also use a writing sample that is assessed for various characteristics. You might want to give students an essay prompt before the study begins and give the same prompt at the end of the study to compare the changes that have occurred in student writing.